

CLAIMS

1. A hair-transplanting apparatus, comprising:
 - a first supplying unit for supplying a base sheet of elastic material to a
5 predetermined position;
 - a base stretching unit for stretching said base sheet at said
predetermined position;
 - a second supplying unit for supplying a hair segment of a
predetermined length to a first side of said base sheet;
 - 10 at least two reciprocating needles with hook ends having an original
position below a second side of said base sheet, said needle hook ends
piercing said base sheet to form holes and reaching beyond said first side of
said base sheet during ascending movement of said needles, said needle
hook ends catching an intermediate portion of said hair segment at said first
15 side of said base sheet and then passing down through said holes to reach
beyond said second side of said base sheet so that said intermediate
portion of said hair segment caught by said hook ends remains on said first
side of said base sheet, whereas a pair of lengthwise hair extensions
extending from opposite sides of said intermediate portion pass through said
20 holes to below said second side of said base sheet;
 - a hair-curling unit for giving a shape-retainable turn at said
intermediate portion of said hair segment which has been caught by said
hook ends of said needle on said first side of said base;
 - a first adhesive applicator for applying first adhesive to each of said
25 turns of said hair segments remaining on said first side of said base sheet,
thereby forming a first adhesive layer each surrounding said turn; and
 - a second adhesive applicator for applying a second adhesive to all
over said first side of said base sheet, including said first adhesive layers,
to form a second adhesive layer;
 - 30 said needle, said hair-curling unit and said first adhesive applicator

being operable while said base sheet is maintained stretched by said base stretching unit, said stretched condition of said base sheet being released or loosened after a predetermined number of said hair segments are transplanted to said base sheet by said needles and secured thereto by said first adhesive layers, followed by forming said second adhesive layer by said second adhesive applicator.

2. The apparatus according to claim 1, wherein said first supplying unit supplies said base sheet upside down, and said second supplying unit supplies said hair segment to above an underside of said base sheet.

3. The apparatus according to claim 1, wherein said second supplying unit comprises means for supplying a continuous, endless hair material in parallel with said base sheet, and a cutter for cutting said continuous, endless hair material when it is supplied by a predetermined amount, thereby obtaining said hair segment of predetermined length.

4. The apparatus according to claim 1, wherein said second supplying unit comprises a hair catcher including a pair of opposed inverted-triangular frames through which said hair segment extends substantially horizontally, with a space therebetween for allowing insertion of said needle hook ends.

5. The apparatus according to claim 4, wherein said hair catcher is rotatable and swingable about a vertical axis in synchronization with reciprocating movement of said needles.

6. The apparatus according to claim 1, wherein said hair-curling unit comprises a heater operable between said hair segment and said first side

of said base sheet, said heater making contact with said intermediate portion of said hair segment when said hair segment carried by said needle hook ends is moved down, whereby said intermediate portion of said hair segment is heated to be partly molten or softened to form said turn of a given shape which remains unchanged after being solidified.

7. The apparatus according to claim 1, wherein said second adhesive applicator applies said second adhesive by adhesive transfer.

8. The apparatus according to claim 1, which further comprises a base lifting member operable in synchronization with said needles for lifting said base sheet, which remains stretched by said base stretching unit, to keep said holes unclosed, thereby allowing smooth entry and passage of said needle hook ends through said holes when said needle hook ends returns to said origins after catching said hair segment.

9. The apparatus according to claim 1, which further comprises a hole repairing unit for injecting repairing liquid to said holes after said needle hook ends carrying said hair segment have separated from said base sheet.

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10. A hair-transplanting method comprising the steps of:

stretching a base sheet of elastic material;

moving needles so that their hook ends pierce said base sheet to form holes and reach beyond a first side of said base sheet;

25 returning said needles to their original position beyond a second side of said base sheet, during which an intermediate portion of said hair segment is caught by said needle hook ends;

transforming said hair segment to provide a shape-retainable turn at

said intermediate portion of said hair segment, after said needle hook ends catch said hair segment but before said needle hook ends carrying said hair segment passes through said holes;

forming first adhesive layers of first adhesive in a dot pattern on said
5 first side of said base sheet around said shape-retainable turns to secure said shape-retainable turns onto said first side of said base sheet;

repeating said needle moving step, said needle returning step, said transforming step and said turn-securing step until a predetermined number of said hair segments are transplanted and secured on said base sheet in
10 such manner that said shape-retainable turn at said intermediate portion of said hair segment remains on said first side of said base sheet between said holes whereas a pair of lengthwise hair extensions extends from opposite ends of said shape-returnable turn through said holes to beyond said second side of said base sheet;

15 releasing or loosening said base sheet from being stretched to contract said base sheet due to its elasticity and reduce diameter of said holes; and

applying second adhesive to form a second adhesive layer entirely covering said first side of said base sheet for fitting on human skin.
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11. The method according to claim 10, wherein said needle moving step comprises elevating said needles from said original position below said second side of said base sheet, and said needle returning step comprises moving said needles down from their upper dead points toward said original
25 position.

12. The method according to claim 10, wherein said needle moving step comprises moving said needles down from said original position above said

second side of said base sheet, and said needle returning step comprises elevating said needles from their lower dead points toward said original position.

- 5 13. The method according to claim 10, wherein said first adhesive layer is formed by applying said first adhesive to said shape-retainable turn substantially at the same time or immediately after said transforming step is carried out to form said shape-retainable turn.
- 10 14. The method according to claim 10, wherein said first adhesive is formed by applying in advance said first adhesive onto said first side of said base sheet between said holes formed by elevation of said needles, and transferring said first adhesive to said shape-retainable turn when said shape-retainable turn makes contact with said first side of said base sheet
- 15 during said needle returning step.
15. A hair-transplanted piece, comprising:
- a thin base sheet of elastic material;
- a predetermined number of hair segments transplanted onto said base
- 20 sheet in such manner that an intermediate portion of each of said hair segment provides a shape-retainable turn remaining and lying on an underside of said base sheet between a pair of holes whereas a pair of lengthwise hair extensions extending from opposite ends of said turn and passing through said holes to orient hair from a external surface of said
- 25 base sheet;
- first adhesive layers in a dot pattern, each overlapping said turn of said hair segment and securing said same onto said underside of said base sheet; and

a second adhesive layer entirely covering said underside of said base sheet, including said first adhesive layers, to provide a flat surface to be fitted onto human skin.

5 16. The hair-transplanted piece according to claim 13, wherein said base sheet comprises a plane sheet.

17. The hair-transplanted piece according to claim 13, wherein said base sheet is colorless and transparent.

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18. The hair-transplanted piece according to claim 13, wherein a main component of said adhesive used to form said first adhesive layer is preferably identical to said base sheet material.

15 19. The hair-transplanted piece according to claim 13, wherein said base sheet is made from urethane-based material and said adhesive forming said first adhesive layer comprises urethane-based adhesive.

20 20. The hair-transplanted piece according to claim 13, wherein a main component of said adhesive used to form said second adhesive layer is different from that of said adhesive used to form said first adhesive layer.

21. The hair-transplanted piece according to claim 13, wherein said adhesive used to form said first adhesive layer comprises urethane-based
25 adhesive, whereas said adhesive used to form said second adhesive layer comprises acryl-based adhesive.

22. The hair-transplanted piece according to claim 13, wherein said

second adhesive layer is formed by transfer.